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TECHNICAL MEMORANDUM

(TM Series)

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Systems Division Program, for Space Systems Division, AFSC.

| | |
|------------------------------------|--------------------|
| Milestone 11 | SYSTEM |
| Computer Utilization Reports (CUR) | DEVELOPMENT |
| by | CORPORATION |
| R. L. Thornton | 2500 COLORADO AVE. |
| 5 April 1963 | SANTA MONICA |
| Approved | CALIFORNIA |
| G. L. Myers | |

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IDENTIFICATION

- A. Title: Computer Utilization Reports (CUR)
Ident 23C, Mod AA
- B. Programmed: 10 April 1962
E. J. Rosenberg, R. L. Thornton, System Development Corporation
- C. Documented: 5 April 1963
R. L. Thornton, System Development Corporation

PURPOSE

CUR is a 160-A program which uses punched cards as input and generates an accurate report of time utilization on all computing equipment within the CPDC.

USAGE

- A. Operating Procedures
 - 1. Clear the computer and load the CUR bootstrap at 7754₈.
 - 2. Mount the CUR master on tape unit one.
 - 3. Ready the 088 Card Reader with the input deck.
 - 4. Clear the computer and run from 0000.
 - 5. Monitor the 161 typewriter.
 - a. When "REPORT NUMBER REQUESTED" is typed, type in the desired report number (1-8).
 - 6. The master tape will be searched for the appropriate report and "PERIOD ENDING" will be typed on the typewriter.
 - a. Type in the appropriate date following the format below.
Weekly Reports: (1, 3, and 5) Monthly Reports (2, 4, 6, 7
EXAMPLE: 4-1-63 EXAMPLE: November 1962 and 8)
 - 7. The input cards will be read and the appropriate report will be listed on the 1612 printer.
 - 8. When the computer types "REPORT NUMBER REQUESTED", CUR has completed the requested report. To run subsequent reports, repeat the sequence of operations starting at Step 4.

B. Parameters

Only two parameters are needed for successful operation of the program. See steps 4 and 5a under Operating Procedures.

C. Halts and error returns

1. All halts in CUR are accompanied by an error message on the typewriter.

- a. "ON TIME GREATER THAN OFF TIME". This indicates that there was an error in transmitting the on and off time to the input card.
- b. "UNASSIGNED OP CODE". An operation code was encountered that is not in the legal list of operation codes. See Appendix A.

D. Tape Assignments

CUR Master on tape unit 1.

E. Data Formats

1. The format of the input card is described in Appendix B.
2. Appendix C is a list of sample reports.

RESTRICTIONS

- A. Input cards must be sorted according to EAM flow chart contained in Appendix D.
- B. The last card of the input deck must be an "X-80" card.
- C. Minimum hardware.

| | |
|------------|--------------------|
| 8K | 160-A |
| 161 | Typewriter |
| 163-2 | Magnetic Tape Unit |
| 088 or 533 | Card Reader |
| 1612 | Printer |

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TIMING

The operating time of CUR is governed by the quantity of inputs and the I/O equipment speed. All I/O is done via the normal channel.

STORAGE REQUIREMENTS

100₈ Cells of Bank 0 for constants.
4113₈ Cells of Bank 0 for the program.
6000₈ Cells of Bank 1 for storage.

VALIDATION TESTS

- A. Input decks were constructed with known errors in them. The program performed all legality checks and caught all errors.
- B. Reports were generated for monthly and weekly utilization. The results were checked against hand calculated figures and the answers were correct.

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A P P E N D I X A

LEGAL OPERATION CODES

COMPUTER PROGRAM DEVELOPMENT CENTER

Computer Operation CodesDOWN TIME CODES

| | |
|----|---|
| 01 | Power OFF |
| 02 | Sched. Maintenance |
| 03 | Unsched. Maintenance |
| 04 | Power Failure |
| 05 | Air-Cond. Failure |
| 06 | Idle - No Work |
| 07 | Machine Failure (Explain in Comments Area) |
| 08 | Set-Up |
| 09 | Demonstrations (Time supplied free of charge by CDC) |

NETWORK OPERATIONS

| | |
|----|----------------------------------|
| 11 | Operator Error |
| 12 | Programmer Error |
| 13 | System Program Error |
| 14 | Other (Explain in Comments Area) |

INDIVIDUAL PROGRAM DEVELOPMENT AND VALIDATION

| | |
|----|--|
| 21 | Assembly and Checkout |
| 22 | Assembly |
| 23 | Program Checkout |
| 24 | Program Validation - Integration |
| 25 | Program Validation - Acceptance |
| 26 | Program Maintenance (error correction) |

SUB-SYSTEM AND SYSTEM TEST

| | |
|----|---|
| 31 | Sub-System Test |
| 32 | System Integration (Building a Master Tape and cycling it) |
| 33 | System Test (Full test of all options for acceptance) |

PRODUCTION (NON-FLIGHT ORIENTED) AND TRAINING

| | |
|----|--------------------|
| 41 | Management Reports |
| 42 | General Production |
| 43 | Training |

PERIPHERAL OPERATIONS

| | |
|----|--|
| 50 | All Peripheral Operations (Record the Ident of the specific peripheral operation in (PRG/SYSTEM ID) |
|----|--|

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APPENDIX B

INPUT CARD FORMAT

CPDC ACCOUNTING CARD
(5081 Stock)

(Page 1 of 2)

| NAME OF FIELD | COLUMNS | | INTERPRET | | A: N: A/N | COMMENTS |
|---------------------------------|---------|----|-----------|-------------------|--------------|---|
| | FROM | TO | LINE | Y.N.S. FROM TO | | |
| Control No. | 1 | 4 | | | X | Punch as coded - blank on Op. Codes 01-09 |
| First Initial | 5 | - | | | X | Space over if none |
| Last Name | 6 | 18 | | | X | Punch as coded - blank on Op. Codes 01, 04-06 |
| Organization | 19 | 22 | | | X | Punch as coded |
| Work Order No. | 23 | 27 | | | X | Punch as coded - blank for Assoc. Cont. O/T MSD |
| Vehicle | 28 | 31 | | | X | Punch as coded - may be blank |
| Program/System ID | 34 | 41 | | | X | Punch as coded - may be blank |
| Operation Code | 42 | 43 | | | X | Punch as coded - must be punched |
| Number Attending | 44 | - | | | X | Punch as coded |
| Operator Number | 45 | 46 | | | X | Punch as coded |
| Computer Used | 48 | - | | | X | 1604 = 1, 160A #1 = 2, 160A #2 = 3, 160A #3 = 4 |
| No. of 1607's Used | 49 | - | | | X | May be blank, 1, 2, 3, or 4 |
| 161 Typewriter | 50 | - | | | X | Punch as a "12" punch if checked |
| 533/1610A Reader Punch | 51 | - | | | X | Punch as a "12" punch if checked |
| 166 Printer if 160A-3 | 52 | - | | | X | Number used, a "1" or "2" |
| 1612 Printer if O/T 160A-3 | 52 | - | | | X | Punch as a "12" punch if checked |
| 163-4 Tape Drives if 160A-3 | 53 | - | | | X | Punch as a "12" punch if checked |
| 163-2 Tape Drives if O/T 160A-3 | 53 | - | | | X | Punch as a "12" punch if checked |
| 068/1610A Card Reader | 54 | - | | | X | Punch as a "12" punch if checked |

| | |
|---------------------------------|-----|
| Control No. | 167 |
| First Initial | 167 |
| Last Name | 167 |
| Organization | 167 |
| Work Order No. | 167 |
| Vehicle | 167 |
| Program/System ID | 167 |
| Operation Code | 167 |
| Number Attending | 167 |
| Operator Number | 167 |
| Computer Used | 167 |
| No. of 1607's Used | 167 |
| 161 Typewriter | 167 |
| 533/1610A Reader Punch | 167 |
| 166 Printer if 160A-3 | 167 |
| 1612 Printer if O/T 160A-3 | 167 |
| 163-4 Tape Drives if 160A-3 | 167 |
| 163-2 Tape Drives if O/T 160A-3 | 167 |
| 068/1610A Card Reader | 167 |

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APPENDIX C

SAMPLE CUR REPORTS

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| CPDC UTILIZATION BY OPERATION WEEK ENDING 03-17-63 | SAMPLE CUR 1 |
|--|--------------|
| OPERATION | NO. OF JOBS |
| 1604 | |
| POWER OFF | |
| SCHED. MAINTENANCE | |
| UNSCHED. MAINTENANCE | |
| IDLE - NO WORK | |
| SET - UP | |
| 17.43 | |
| 15.92 | |
| .26 | |
| 1.85 | |
| 9.77 | |
| 45.23* | |
| REWORK - OPERATOR ERROR | 2 |
| REWORK - PROGRAMMER ERROR | 1 |
| ASSEMBLY AND CHECKOUT | 24 |
| ASSEMBLY | 72 |
| PROGRAM CHECKOUT | 254 |
| PROGRAM VALIDATION - INTEGRATION | 3 |
| PROGRAM VALIDATION - ACCEPTANCE | 3 |
| PROGRAM MAINTENANCE ERROR CORRECTION | 3 |
| SUBSYSTEM TEST | 4 |
| SYSTEM INTEGRATION | 3 |
| 2.07 | 369* |
| 122.77* | |
| 168.00** | 369** |

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SUMMARY OF 1604 . . . UTILIZATION BY ORGANIZATION . . . FEBRUARY 1963 . . . SAMPLE CUR 2

| ORGANIZATION | 1604 | NO. OF JOBS |
|--------------|----------|-------------|
| LFE | 67.17 | 187 |
| MSVD | 26.35 | 30 |
| STL | 51.83 | 80 |
| 8362 | 2.43 | 15 |
| 8363 | 2.27 | 9 |
| 8365 | 25.92 | 158 |
| 8372 | 150.55 | 366 |
| 8373 | 107.78 | 464 |
| 8374 | 45.25 | 91 |
| SDC | 334.20* | 1103* |
| | 479.55** | 1400** |

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CPDC UTILIZATION BY ORGANIZATION WEEK ENDING 03-17-63 SAMPLE CUR 3

| ORGANIZATION | 1604 | NO. OF JOBS |
|--------------|----------|-------------|
| LFE | 23.38 | 65 |
| MSVD | 12.61 | 12 |
| STL | 29.25 | 32 |
| 8362 | .41 | 3 |
| 8363 | .27 | 2 |
| 8365 | 7.24 | 62 |
| 8372 | 37.70 | 84 |
| 8373 | 18.12 | 99 |
| 8374 | 3.56 | 10 |
| SDC | 67.30* | 260* |
| | 132.54** | 369** |

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SUMMARY OF 1604 . . . UTILIZATION BY AREA OF WORK . . . FEBRUARY 1963 SAMPLE CUR 4

| W. O. | VEHICLE | 1604 | NO. OF JOBS |
|--------|---------|---------|-------------|
| 662.09 | 1800 | 1.29 | 4 |
| 662.21 | 1159 | 25.31 | 38 |
| 662.22 | 1164 | .77 | 2 |
| 662.23 | | 26.08* | 40* |
| 662.33 | 2314 | 15.29 | 26 |
| 662.35 | 2353 | 9.78 | 14 |
| 662.36 | | 25.07* | 40* |
| 662.37 | 3502 | 18.88 | 57 |
| 662.43 | 3503 | .22 | 1 |
| 662.45 | | 19.10* | 58* |
| 662.51 | 4800 | 83.86 | 170 |
| 662.52 | 4801 | 101.85 | 201 |
| 662.53 | | 185.71* | 371* |
| 662.83 | | .99 | 7 |
| 663.15 | | 44.21 | 88 |
| 663.16 | | .22 | 1 |
| | | 1.20 | 9 |
| | | 29.30 | 77 |
| | | 7.19 | 38 |
| | | .30 | 2 |
| | | 15.85 | 43 |
| | | 14.08 | 68 |
| | | 4.94 | 25 |
| | | 1.15 | 4 |
| | | .61 | 3 |
| | | 11.53 | 26 |
| | | 2.27 | 9 |
| | | .06 | 1 |
| | | 1.94 | 3 |

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SUMMARY OF 1604 . . . UTILIZATION BY AREA OF WORK . . FEBRUARY 1963 SAMPLE CUR 4

| W. O. | VEHICLE | 1604 | NO. OF JOBS |
|--------|---------|----------|-------------|
| 663.17 | | 4.34 | 5 |
| 663.25 | | .80 | 3 |
| 663.33 | | 9.92 | 64 |
| 663.35 | | 6.91 | 40 |
| 663.36 | | 8.13 | 36 |
| 663.37 | | .18 | 1 |
| 663.43 | | .66 | 6 |
| 663.45 | | 29.60 | 170 |
| 663.55 | | 2.67 | 4 |
| 663.63 | | 23.13 | 152 |
| 663.65 | | .12 | 2 |
| | | 222.30* | 887* |
| | | 479.55** | 1400** |

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| W. O. | VEHICLE | 1604 | NO. OF JOBS | SAMPLE CUR 5 |
|--------|---------|----------|-------------|--------------|
| | 1164 | 2.49 | 8 | |
| | 2314 | .44 | 1 | |
| | 2353 | .38 | 3 | |
| | | .82* | 4* | |
| | 4800 | 38.84 | 59 | |
| | 4801 | 50.83 | 90 | |
| | | 89.67* | 149* | |
| 662.09 | | .16 | 1 | |
| 662.21 | | 3.56 | 10 | |
| 662.23 | | .73 | 4 | |
| 662.33 | | 3.01 | 10 | |
| 662.35 | | .96 | 6 | |
| 662.36 | | .06 | 1 | |
| 662.37 | | 1.50 | 7 | |
| 662.43 | | 2.73 | 11 | |
| 662.45 | | .81 | 7 | |
| 662.53 | | 2.13 | 10 | |
| 662.57 | | .12 | 1 | |
| 663.01 | | .27 | 2 | |
| 663.16 | | .33 | 2 | |
| 663.17 | | 6.53 | 15 | |
| 663.25 | | .02 | 1 | |
| 663.26 | | .12 | 1 | |
| 663.33 | | .68 | 8 | |
| 663.35 | | 1.12 | 9 | |
| 663.36 | | .33 | 3 | |
| 663.37 | | 1.42 | 2 | |
| 663.45 | | 2.62 | 17 | |
| 663.47 | | 3.11 | 18 | |
| 663.57 | | 1.04 | 2 | |
| 663.63 | | 6.20 | 60 | |
| | | 39.56* | 208* | |
| | | 132.54** | 369** | |

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| DETAILED 1604 UTILIZATION BY ORGANIZATION FEBRUARY 1962 | | | | | | SAMPLE CUR 6 |
|---|-----------|---------|----------|----------|-------------|--------------|
| ORGANIZATION | REQUESTOR | ID | OP. CODE | 1604 | NO. OF JOBS | |
| XXXX | SMITH | COP | 22 | .14 | 1 | |
| | | | 23 | 5.12 | 14 | |
| | | | | 5.26* | 15* | |
| | COP/LMSC | | 23 | 2.14 | 5 | |
| | | | | 2.14* | 5* | |
| | | | | 7.40** | 20** | |
| | JONES | ANTRACK | 22 | .10 | 1 | |
| | | | | .10* | 1* | |
| | | COP | 14 | .22 | 2 | |
| | | | 22 | .08 | 1 | |
| | | | 23 | 2.06 | 7 | |
| | | | | 2.36* | 10* | |
| | COP/LMSC | | 08 | .02 | 1 | |
| | | | | .36 | 1* | |
| | PASS | | 22 | .38* | 1 | |
| | | | | .06 | 1* | |
| | | | | .06* | 13** | |
| | DOE | COP | 22 | 2.90** | 5 | |
| | | | | .57 | 15 | |
| | | | | 7.25 | 20* | |
| | POSTPASS | | 22 | 7.82* | 1 | |
| | | | | .22 | 1* | |
| | REDUCE | | 14 | .22* | 1 | |
| | | | | .15 | 1 | |
| | | | | .11 | 1 | |
| | | | | .58 | 2 | |
| | | | 23 | .84* | 4* | |
| | | | | 8.88** | 25** | |
| | | | | 19.18*** | 58*** | |

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| SUMMARY OF 1604 | SYSTEM UTILIZATION | FEBRUARY 1963 | SAMPLE CUR 7 | |
|--------------------------------------|--------------------|---------------|--------------|---------|
| OPERATION | NO. JOBS | 1604 | 533/1610A | 1612 |
| POWER OFF | | 84.00 | | |
| SCHED. MAINTENANCE | | 72.17 | | |
| UNSCHED. MAINTENANCE | | 4.58 | | |
| POWER FAILURE | | .17 | | |
| IDLE - NO WORK | | 30.04 | | |
| MACHINE FAILURE | | 1.49 | | |
| SET - UP | | 42.32 | | |
| | | 234.77* | | |
| REWORK - OPERATOR ERROR | 29 | 5.47 | 5.47 | 5.47 |
| REWORK - PROGRAMMER ERROR | 11 | 2.33 | 2.33 | 2.33 |
| REWORK - SYSTEM ERROR | 1 | 1.54 | 1.54 | 1.54 |
| REWORK - OTHER | 3 | .36 | .36 | .36 |
| ASSEMBLY AND CHECKOUT | 74 | 31.17 | 31.17 | 31.17 |
| ASSEMBLY | 318 | 47.79 | 47.79 | 47.79 |
| PROGRAM CHECKOUT | 854 | 276.23 | 276.13 | 276.17 |
| PROGRAM VALIDATION - INTEGRATION | 15 | 9.53 | 9.53 | 9.53 |
| PROGRAM VALIDATION - ACCEPTANCE | 6 | 1.13 | 1.13 | 1.13 |
| PROGRAM MAINTENANCE ERROR CORRECTION | 4 | .96 | .96 | .96 |
| SUBSYSTEM TEST | 4 | .92 | .92 | .92 |
| SYSTEM INTEGRATION | 71 | 55.33 | 55.33 | 55.33 |
| MANAGEMENT REPORTS | 1 | .14 | .14 | .14 |
| HARDWARE QUALITY CONTROL | 9 | 4.33 | 1.61 | 1.79 |
| | 1400* | 437.23* | 434.41* | 434.63* |
| | | 672.00** | | |

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| SUMMARY OF 160A-1 | SYSTEM UTILIZATION | FEBRUARY 1963 | | | | SAMPLE CUR 8 | | | |
|-------------------------|--------------------|---------------|---------|--------|--------|--------------|--------|--------|-------|
| OPERATION | NO. JOBS | 160A-1 | 163-2 | 161 | 1612 | 088 | 523 | 1610A | 169 |
| POWER OFF | | 97.82 | | | | | | | |
| SCHED. MAINTENANCE | | 21.52 | | | | | | | |
| UNSCHED. MAINTENANCE | | .31 | | | | | | | |
| IDLE - NO WORK | | 428.49 | | | | | | | |
| SET - UP | | 6.66 | | | | | | | |
| DEMONSTRATIONS | | 2.58 | | | | | | | |
| | | 557.38* | | | | | | | |
| REWORK - OPERATOR ERROR | 8 | .83 | .83 | .83 | .83 | .36 | | .36 | |
| ASSEMBLY AND CHECKOUT | 4 | 3.87 | 3.87 | 1.75 | 3.87 | 3.87 | .44 | 3.87 | |
| ASSEMBLY | 26 | 7.44 | 7.02 | 5.37 | 7.44 | 7.06 | 6.60 | 7.44 | .34 |
| PROGRAM CHECKOUT | 30 | 18.66 | 10.05 | 8.36 | 8.85 | 9.99 | 4.78 | 9.99 | 3.15 |
| SUBSYSTEM TEST | 4 | 7.31 | 7.31 | 5.86 | 7.31 | 7.31 | 1.45 | 7.31 | 1.67 |
| MANAGEMENT REPORTS | 3 | .77 | .77 | .77 | .77 | .77 | | .77 | |
| PERIPHERAL OPERATIONS | 398 | 75.74 | 72.63 | 72.61 | 65.79 | 11.51 | 3.61 | 13.71 | |
| | 473* | 114.62* | 102.48* | 95.55* | 94.86* | 40.87* | 16.88* | 43.45* | 5.16* |
| | | 672.00** | | | | | | | |

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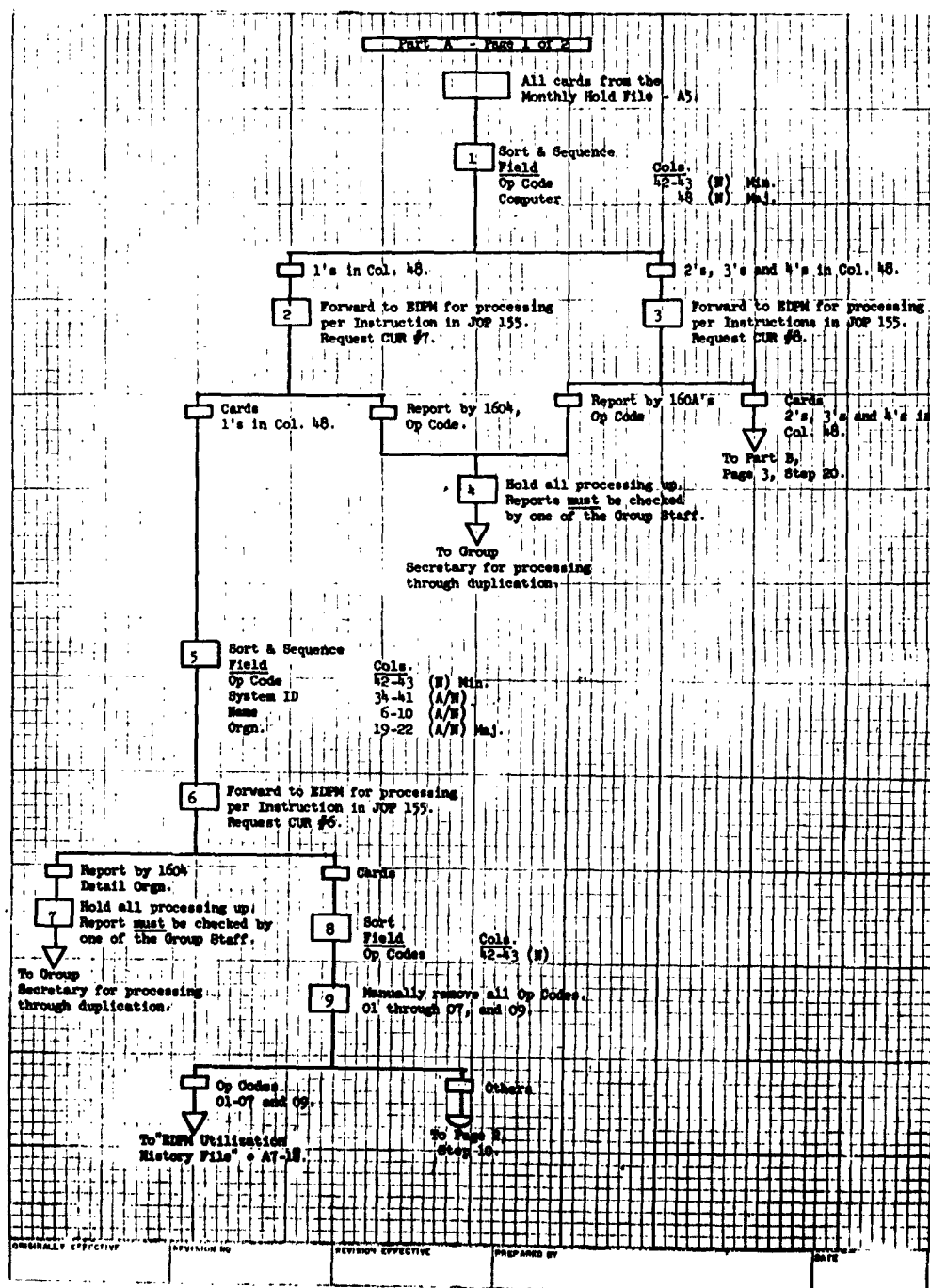
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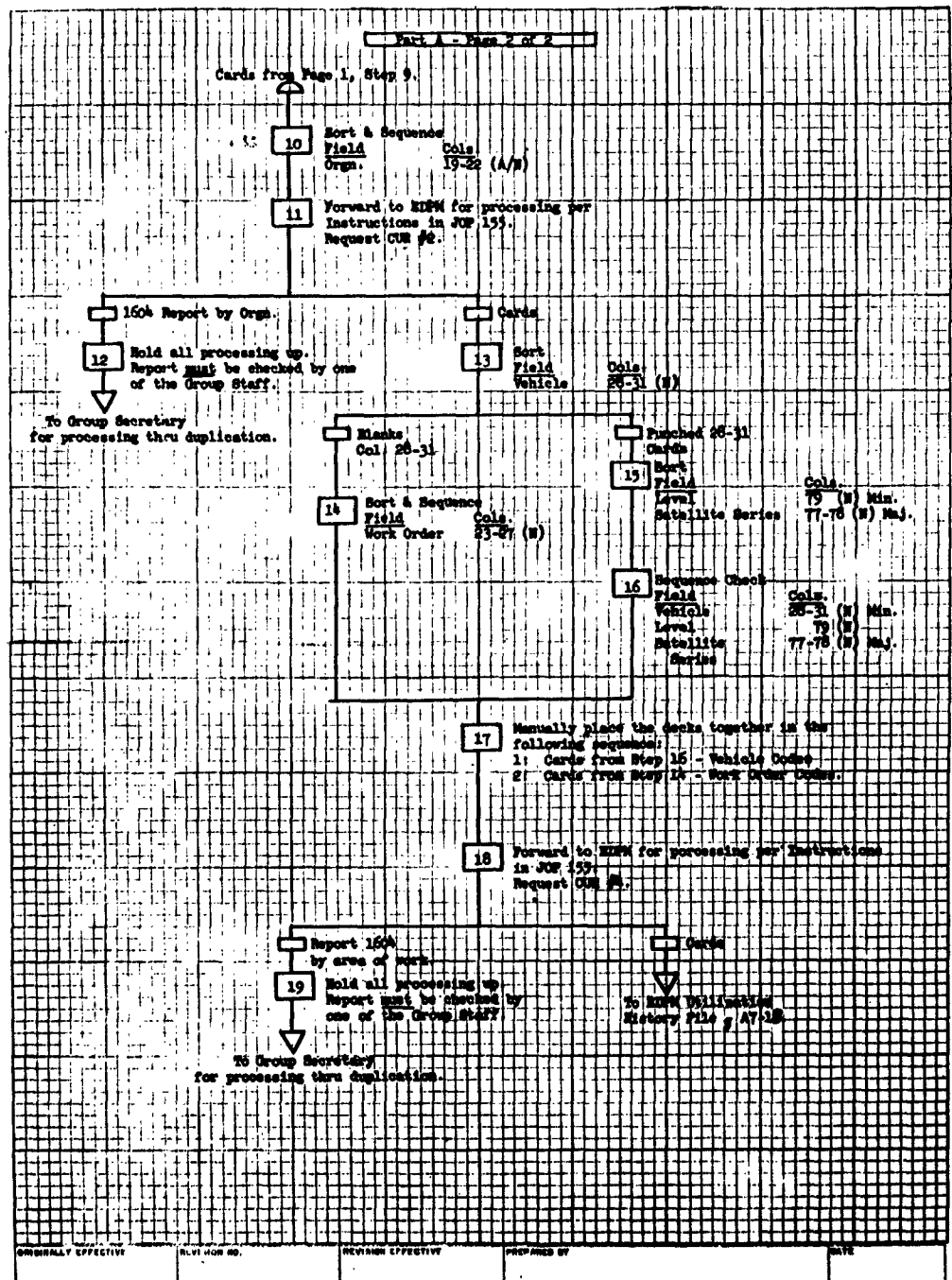
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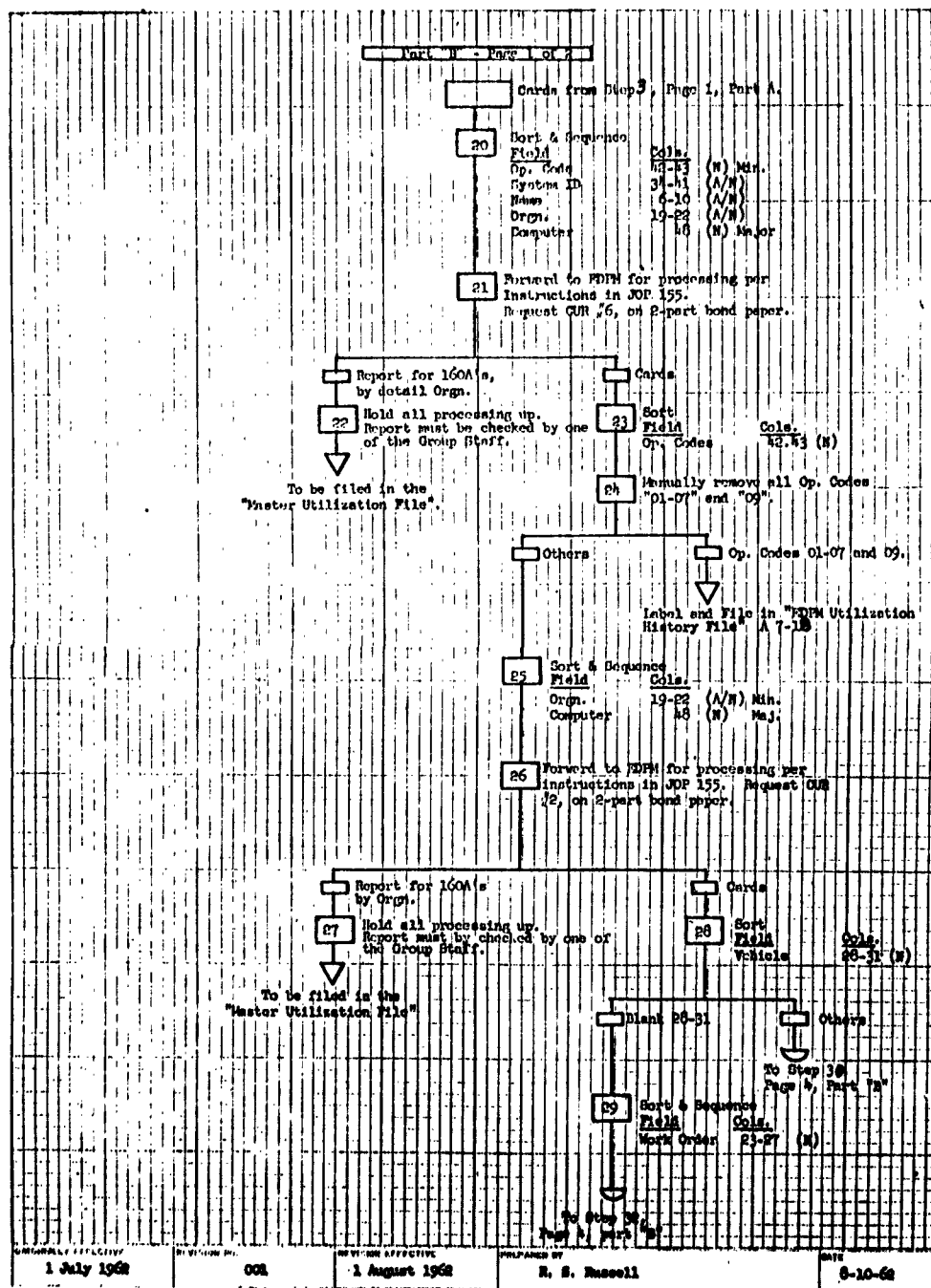
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CUR TABULATING FLOW CHARTS

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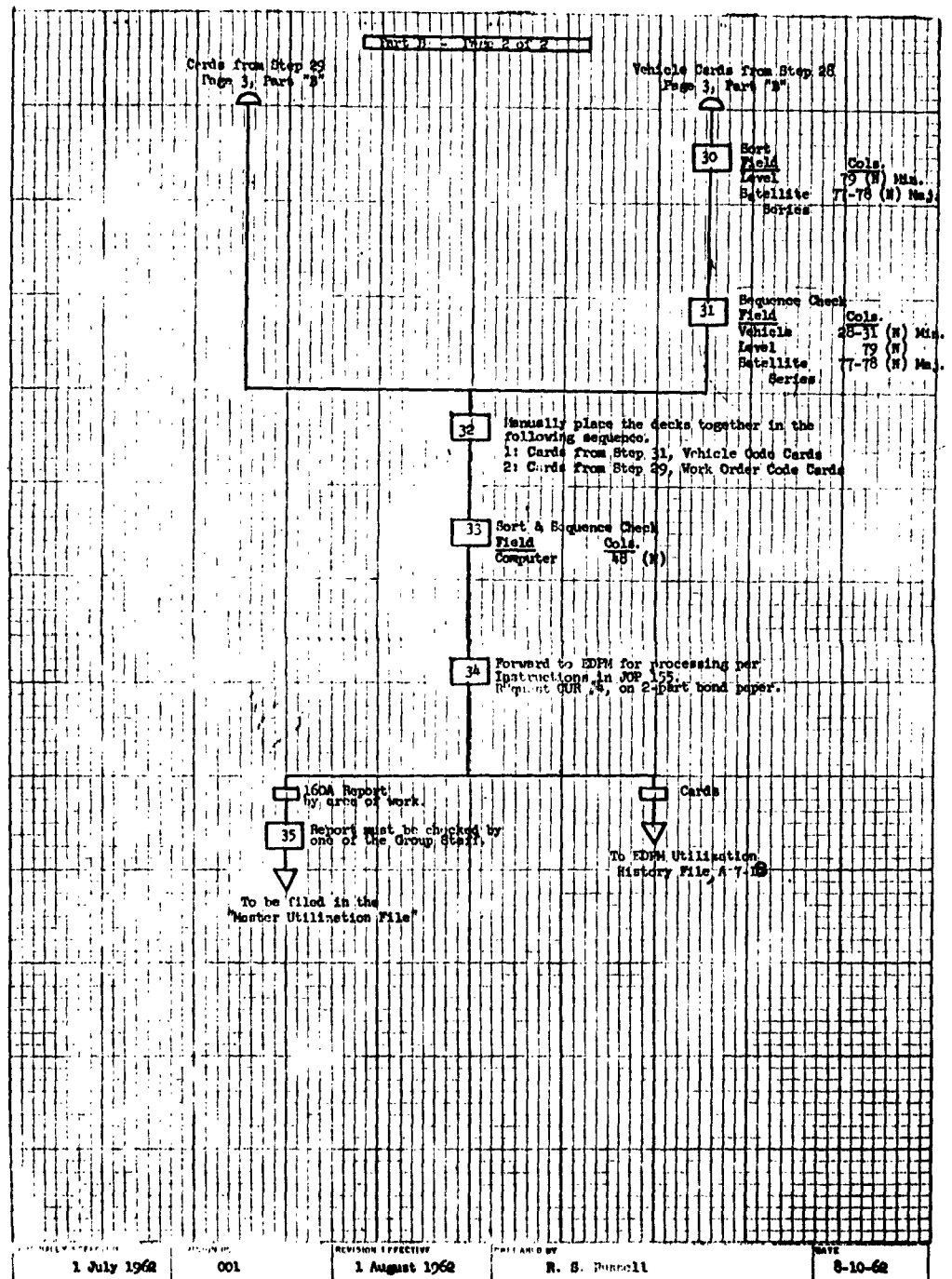




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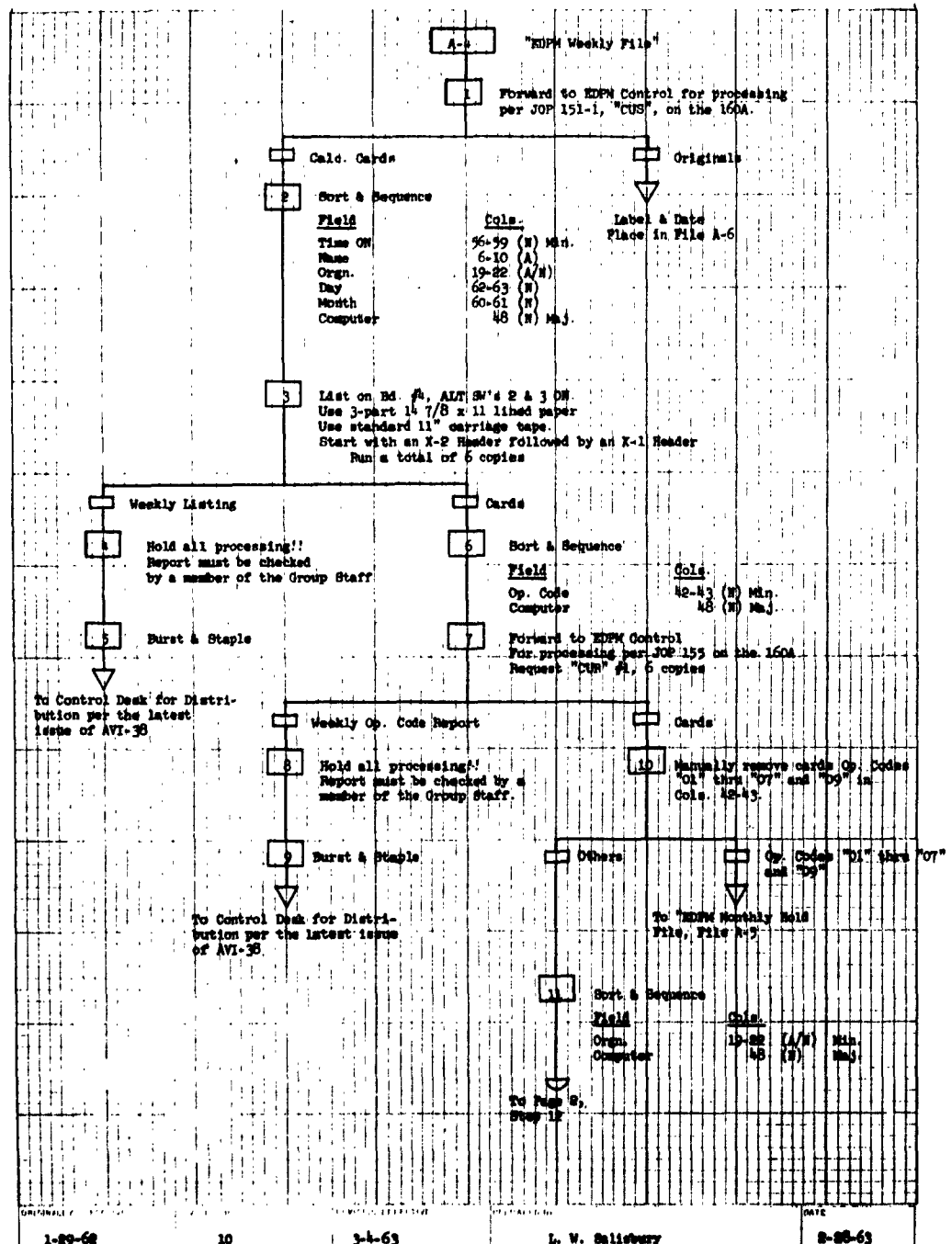


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Weekly Machine Utilization



1-63-62

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3-4-63

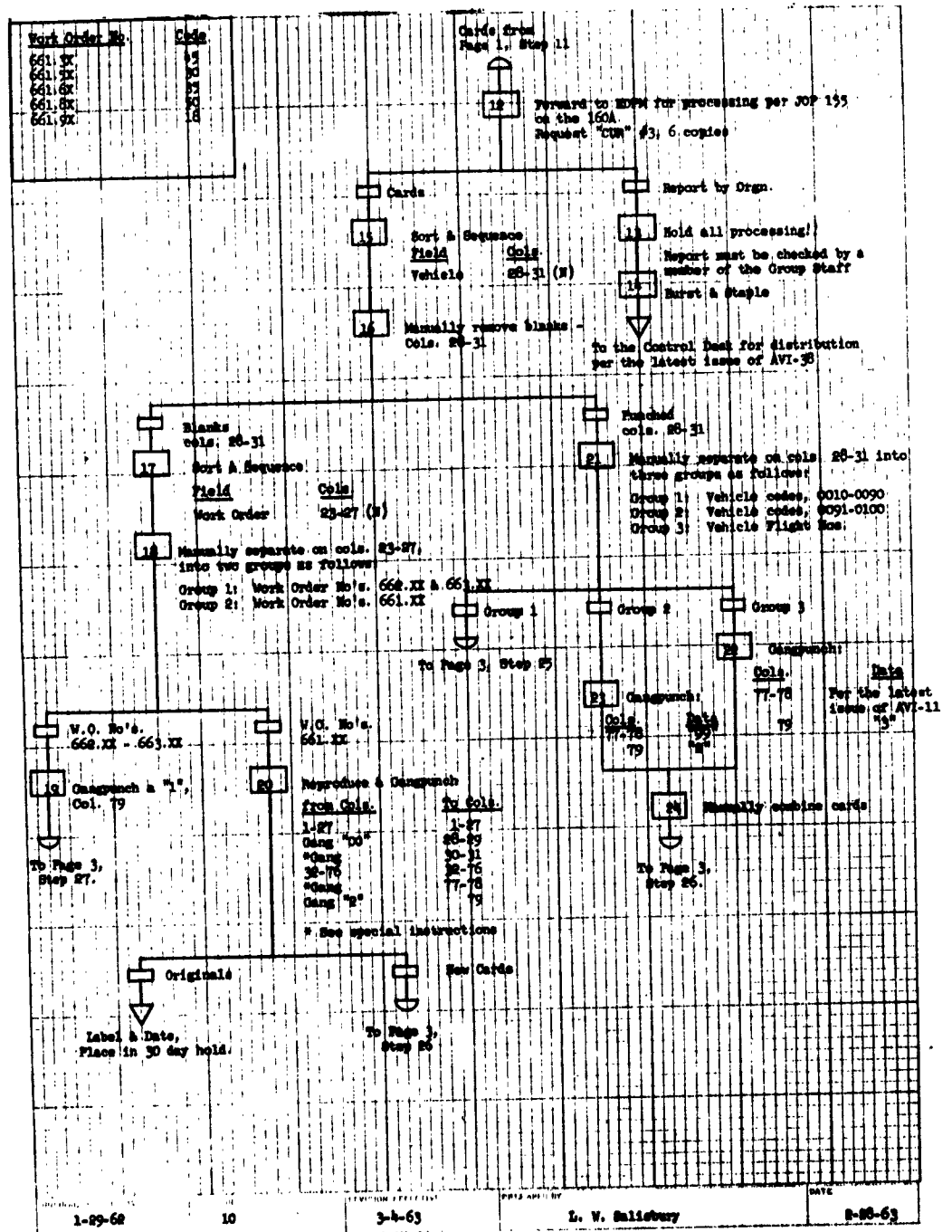
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2-63-63

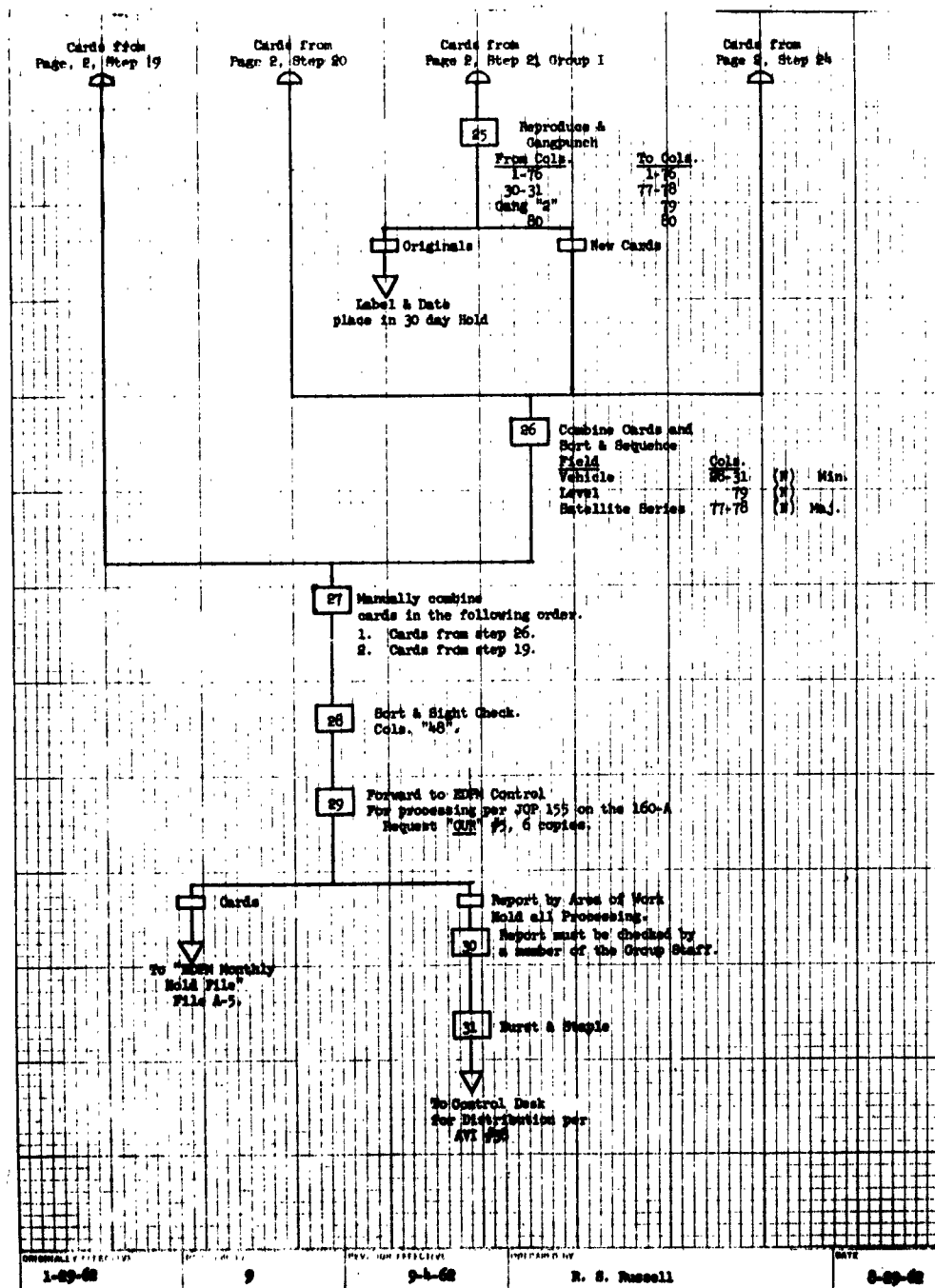
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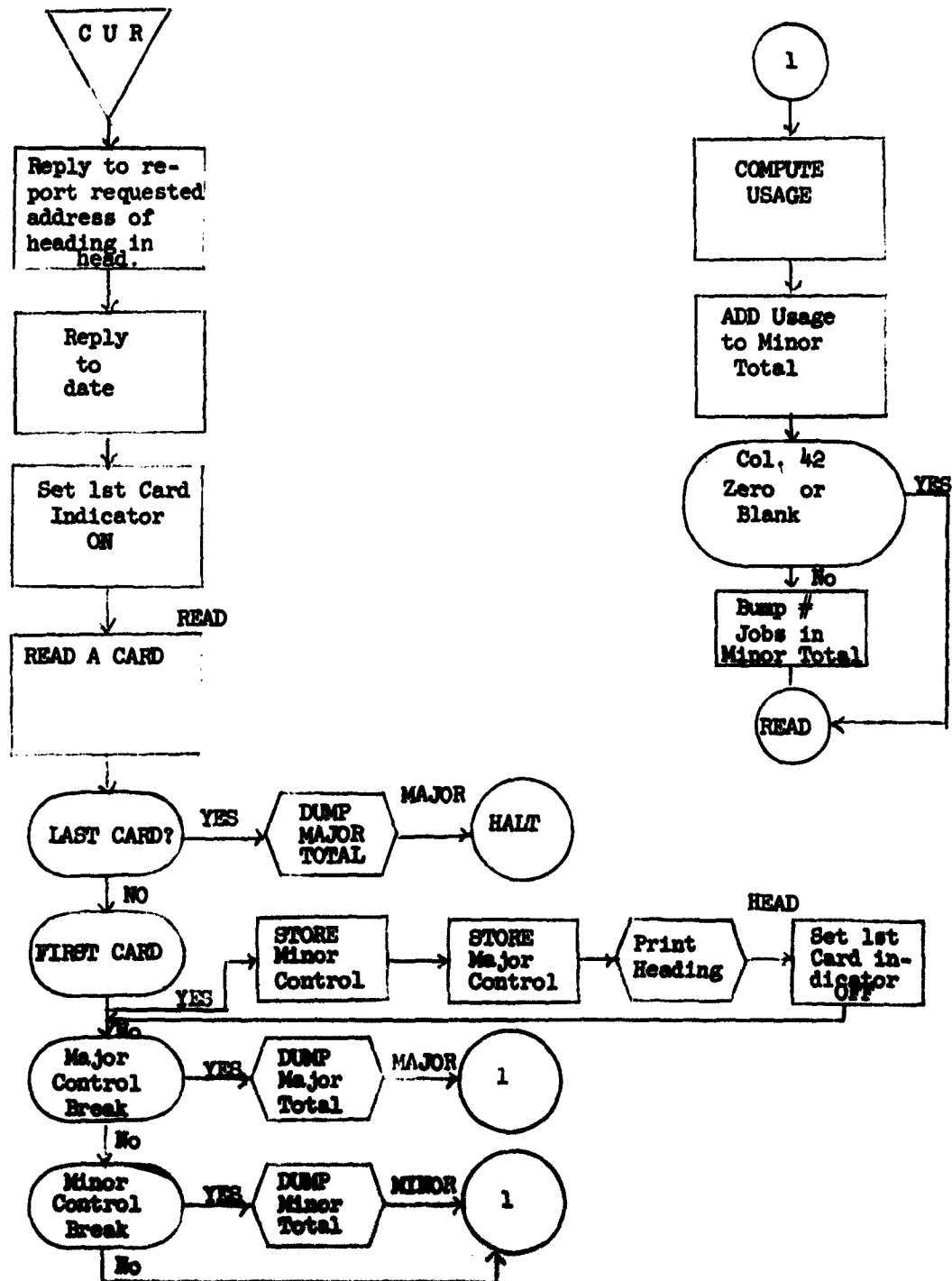
APPENDIX E

CUR FLOW DIAGRAMS

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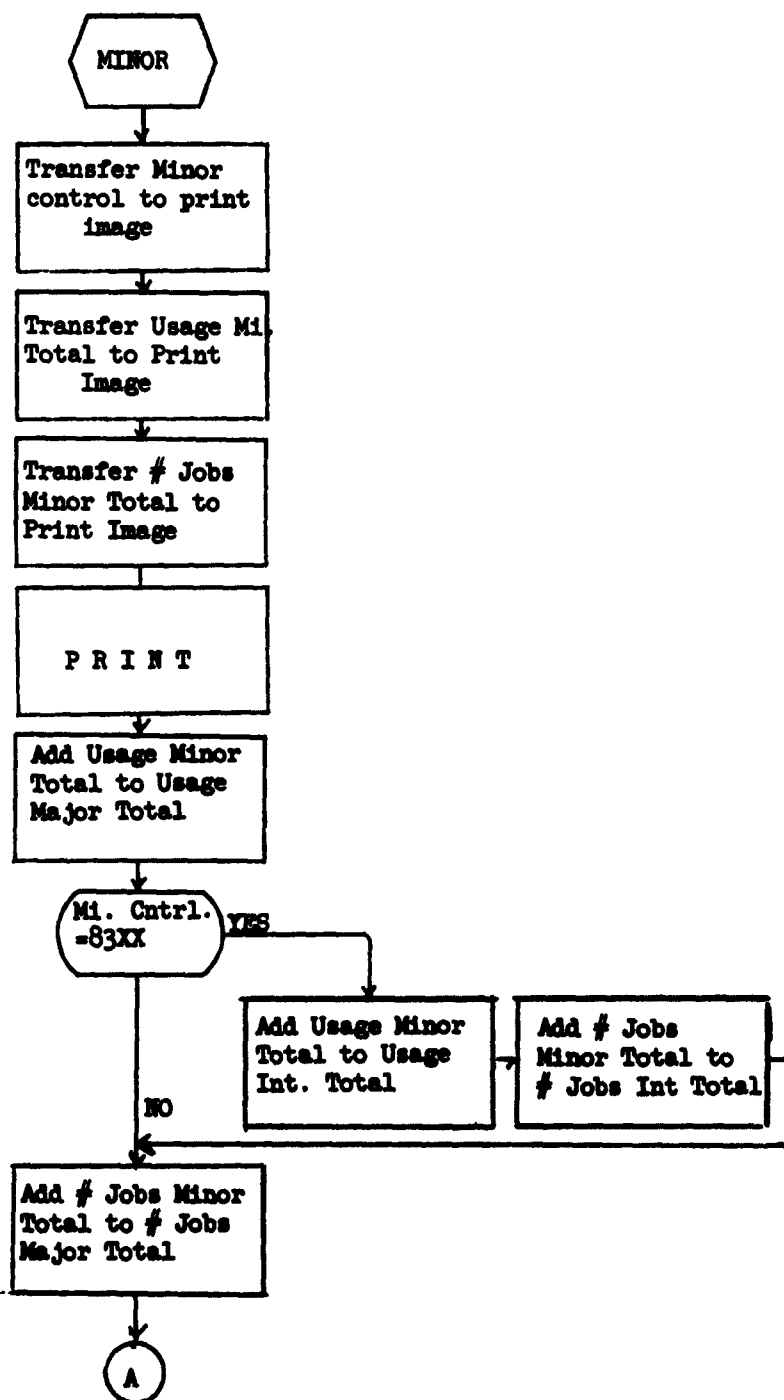
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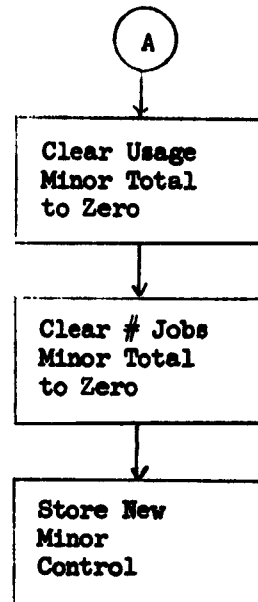
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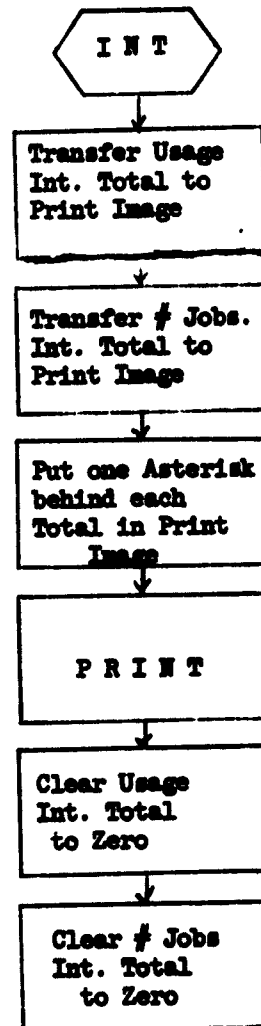
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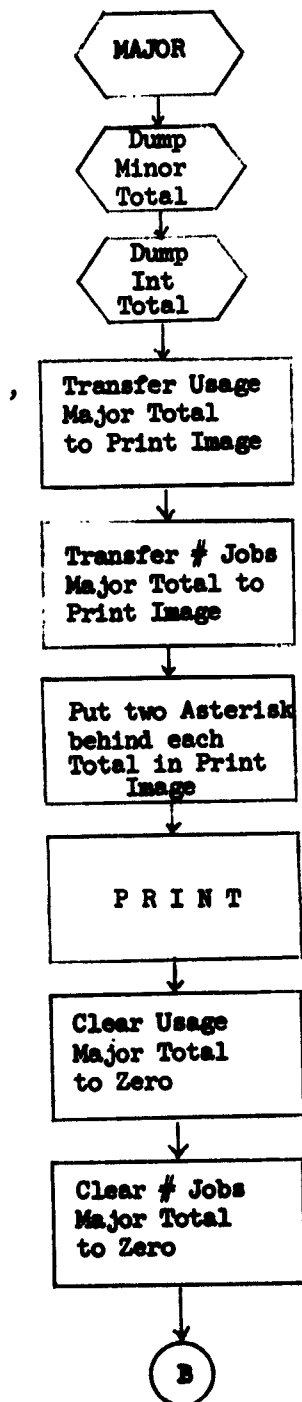
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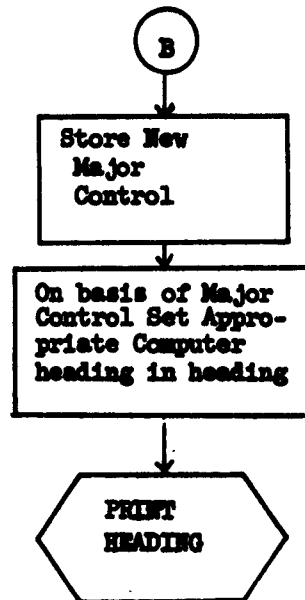
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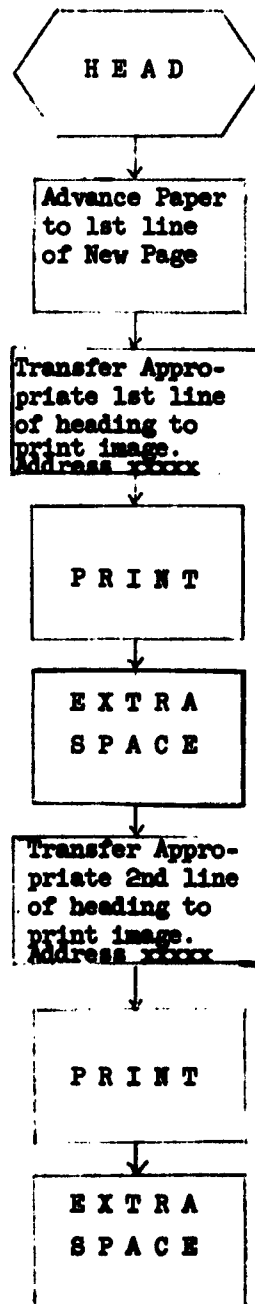
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H. D. Gilman

PIR-E4 (GE-Bethesda)

W. L. Massey

PIR-E4 (GE-Box 8661)

J. D. Rogers

PIR-E2 (Philco)

J. A. Bean

J. A. Isaacs

R. Morrison

S. M. Stanley

PIR-E3 (LFE)

D. F. Criley

K. B. Williams

PIR-E8

F. Druding

PIR-E5 (Aerospace)

F. M. Adair

R. O. Brandsberg

L. H. Garcia

G. J. Hansen

C. S. Hoff

L. J. Kreisberg

T. R. Parkin

E. E. Retslaff

H. M. Reynolds

D. Saadeh

R. G. Stephenson

V. White

PIR-E7 (STL)

A. J. Carlson

R. L. Mills

(2)

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| | | | |
|------------------|-----------|-------------------|-----------|
| AFCPL | (5) | KEDDY, J. R. | 24105 |
| ALLFREE, D. | 24083 | KEY, C. D. | 23013 |
| ALPERIN, N. I. | 22153 | KEYES, R. A. | 24073 |
| ARMSTRONG, E. | 24123 | KINKEAD, R. L. | 22093 |
| BERNARDS, R. M. | SUNNYVALE | KNEEMEYER, J. A. | 22088A |
| BIGGAR, D. | 24118A | KNIGHT, R. D. | 22119 |
| BILEK, R. W. | 23007 | KOLBO, L. A. | 22155 |
| BLACK, H. | 14039 | KOSTINER, M. | 14056B |
| BRENTON, L. R. | 24103B | KRALIAN, R. P. | 14039 |
| BURKE, B. E. | 24086 | KRISTENSEN, K. | SUNNYVALE |
| BURKE, R. F. | 22158 | LACHAPELLE, F. | 22093 |
| CHAMPAIGN, M. E. | 22152 | LAUGHLIN, J. L. | 24073 |
| CHIODINI, C. M. | 24091 | LAVINE, J. | 24093 |
| CIACCIA, B. G. | 24082A | LITTLE, J. L. | 24088B |
| CLINE, B. J. | 24127 | LONG, F. | 22156 |
| COGLEY, J. L. | 22156 | MADRID, G. A. | 22081 |
| CONGER, L. | 24088A | MAHON, G. A. | 24089 |
| COOLEY, P. R. | 24081 | MARIONI, J. D. | 24076B |
| COURT, T. D. | 24086B | MARTIN, W. P. | 24127B |
| CRUM, D. W. | 24105 | MCKEOWN, J. | 23013 |
| DANT, G. B. | 24086B | MICHAELSON, S. A. | 14039 |
| DECUIR, L. E. | 24053A | MILANESE, J. J. | 22155 |
| DERANGO, W. C. | 24082B | MUNSON, J. B. | 22087A |
| DEXTER, G. W. | 25016 | MYERS, G. L. | 14056A |
| DISSE, R. J. | 23014 | NELSON, P. A. | 24075 |
| DOBBS, G. H. | 22116B | NG, J. | 22077 |
| DOBRUSKY, W. B. | 24065A | NGOU, L. | 24127 |
| ELLIS, R. C. | 22131A | PADGETT, L. A. | 24110A |
| FMIGH, G. A. | 14039 | PATIN, O. E. | SUNNYVALE |
| ERICKSEN, S. R. | 22113 | POLK, T. W. | 24113 |
| FELKINS, J. | 24097 | PRUETT, B. R. | 22084 |
| FOSTER, G. A. | 14039 | RAYBIN, M. | 14039 |
| FRANKS, M. A. | 24122 | REILLY, D. F. | 24121 |
| FREY, C. R. | 22078 | REMSTAD, C. L. | 25026 |
| FRIEDEN, H. J. | 22082 | RUSSELL, R. S. | 14054 |
| GARDNER, S. A. | 25026 | SCHOLZ, J. W. | 14039 |
| GREENWALD, I. D. | 22094A | SCOTT, R. J. | 24110 |
| GRIFFITH, E. L. | 22081 | SEACAT, C. M. | SUNNYVALE |
| HAAKE, J. W. | 22153 | SEIDEN, H. R. | 22126B |
| HARRIS, E. D. | 24081 | SHAPIRO, R. S. | 24110B |
| HENLEY, D. E. | 22094B | SKELTON, R. H. | 22148 |
| HILL, C. L. | 22101 | SOLOMON, J. | 22076 |
| HILLHOUSE, J. | 22078 | SPEER, N. J. | 24086A |
| HOLMES, M. A. | 24103 | STONE, E. S. | 24058B |
| HOLZMAN, H. J. | 24065B | SWEENEY, M. J. | 25026 |
| HOUGHTON, W. H. | 24103B | TABER, W. E. | 22101 |
| HOYT, R. L. | 14039 | TENNANT, T. C. | 27029 |
| IMEL, L. E. | 14039 | TESTERMAN, W. D. | 14039 |
| KASTAMA, P. T. | 22076 | THOMPSON, J. W. | 24088 |
| KAYSER, F. M. | 24109 | THORNTON, R. L. | 14050 |

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TOTSCHEK, R. A.
VORHAUS, A. H.
WAGNER, I. T.
WARSHAWSKY, S. B.
WEST, G. D.
WEST, G. P.
WILSON, G. D.

24120
24076A
24093
24097
SUNNYVALE
22116A
24124

WINSOR, M. E.
WINTER, J. E.
WISE, R. C.
WONG, J. P.
ZACHTE, S. A.
ZUBRIS, C. J.

22156
24117
22085
SUNNYVALE
24086
24075

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